

CLAIMS

1. A photomask defect testing method comprising the steps of :

a first step of creating corrected photomask design data by correcting photomask design data obtained on the basis of device design so that the exposure transfer pattern according to said photomask design data becomes closer to that according to said photomask design data before correction;

a second step of creating reference data for photomask defect testing according to said corrected photomask design data;

a third step of creating sensor data by measuring the shape of the photomask formed on the basis of said corrected photomask design data using a sensor; and

a fourth step of detecting defects on said photomask by comparing said reference data with said sensor data; characterized in that said first step further comprises:

a step of extracting first non-testing region data indicating non-testing regions including pattern portions having a predetermined width or less and pattern spaces having a predetermined value or less from said photomask design data;

a step of selecting said first non-testing region data on the basis of a predetermined standard by comparing said extracted first non-testing region data with said photomask design data before correction corresponding to said non-testing regions; and

a step of storing said selected first non-testing region data so as to be included in said corrected photomask design data; and

said fourth step further comprises:

a step of excluding said non-testing regions on said photomask indicated by said first non-testing region data and comparing said reference data with said sensor data.

2. A photomask defect testing method of claim 1, characterized in that said photomask design data includes beforehand second non-testing region data indicating non-testing regions including pattern portions having a predetermined width or less and pattern spaces having a predetermined value or less; and said first step further comprises a step of finally creating non-testing region data by ORing said first non-testing region data with said second non-testing region data.

3. A photomask defect testing method of claim 1, wherein said predetermined width and said predetermined value are the minimum value detectable at said fourth step.

4. A photomask defect testing method comprising the steps of:
a first step of creating corrected photomask design data by correcting photomask design data obtained on the basis of device design so that the exposure transfer pattern according to said photomask design data becomes closer to that according to said

photomask design data before correction;

a second step of creating reference data for photomask defect testing according to said corrected photomask design data;

a third step of creating sensor data by measuring the shape of the photomask formed on the basis of said corrected photomask design data using a sensor; and

a fourth step of detecting defects on said photomask by comparing said reference data with said sensor data; characterized in that said photomask design data includes non-testing region data indicating non-testing regions including pattern portions having a predetermined width or less and pattern spaces having a predetermined value or less; and

at said fourth step, said non-testing regions on said photomask, indicated by said non-testing region data, are excluded and said reference data is compared with said sensor data.

5. A photomask defect testing method of claim 4, wherein said predetermined width and said predetermined value are the minimum value detectable at said fourth step.

6. A photomask manufacturing method of manufacturing photomasks by testing photomask defects, comprising the steps of:

a first step of creating corrected photomask design data by correcting photomask design data obtained on the basis of device design so that the exposure transfer pattern according to said

photomask design data becomes closer to that according to said photomask design data before correction;

a second step of creating reference data for photomask defect testing according to said corrected photomask design data;

a third step of creating sensor data by measuring the shape of the photomask formed on the basis of said corrected photomask design data using a sensor; and

a fourth step of detecting defects on said photomask by comparing said reference data with said sensor data; characterized in that said first step further comprises:

a step of extracting first non-testing region data indicating non-testing regions including pattern portions having a predetermined width or less and pattern spaces having a predetermined value or less from said photomask design data;

a step of selecting said first non-testing region data on the basis of a predetermined standard by comparing said extracted first non-testing region data with said photomask design data before correction corresponding to said non-testing regions; and

a step of storing said selected first non-testing region data so as to be included in said corrected photomask design data; and

said fourth step further comprises:

a step of excluding said non-testing regions on said photomask indicated by said first non-testing region data and comparing said reference data with said sensor data.

7. A photomask manufacturing method of manufacturing photomasks by testing photomask defects, comprising the steps of:

a first step of creating corrected photomask design data by correcting photomask design data obtained on the basis of device design so that the exposure transfer pattern according to said photomask design data becomes closer to that according to said photomask design data before correction;

a second step of creating reference data for photomask defect testing according to said corrected photomask design data;

a third step of creating sensor data by measuring the shape of the photomask formed on the basis of said corrected photomask design data using a sensor; and

a fourth step of detecting defects on said photomask by comparing said reference data with said sensor data; characterized in that said photomask design data includes non-testing region data indicating non-testing regions including pattern portions having a predetermined width or less and pattern spaces having a predetermined value or less; and

at said fourth step, said non-testing regions on said photomask, indicated by said non-testing region data, are excluded and said reference data is compared with said sensor data.

8. A semiconductor integrated circuit manufacturing method of manufacturing semiconductor integrated circuits by using photomasks, comprising the steps of:

a first step of creating corrected photomask design data by correcting photomask design data obtained on the basis of device design so that the exposure transfer pattern according to said photomask design data becomes closer to that according to said photomask design data before correction;

a second step of creating reference data for photomask defect testing according to said corrected photomask design data;

a third step of creating sensor data by measuring the shape of the photomask formed on the basis of said corrected photomask design data using a sensor; and

a fourth step of detecting defects on said photomask by comparing said reference data with said sensor data; characterized in that said first step further comprises:

a step of extracting first non-testing region data indicating non-testing regions including pattern portions having a predetermined width or less and pattern spaces having a predetermined value or less from said photomask design data;

a step of selecting said first non-testing region data on the basis of a predetermined standard by comparing said extracted first non-testing region data with said photomask design data before correction corresponding to said non-testing regions; and

a step of storing said selected first non-testing region data so as to be included in said corrected photomask design data; and

said fourth step further comprises:

a step of excluding said non-testing regions on said

photomask indicated by said first non-testing region data and comparing said reference data with said sensor data.

9. A semiconductor integrated circuit manufacturing method of manufacturing semiconductor integrated circuits by using photomasks, comprising the steps of:

a first step of creating corrected photomask design data by correcting photomask design data obtained on the basis of device design so that the exposure transfer pattern according to said photomask design data becomes closer to that according to said photomask design data before correction;

a second step of creating reference data for photomask defect testing according to said corrected photomask design data;

a third step of creating sensor data by measuring the shape of the photomask formed on the basis of said corrected photomask design data using a sensor; and

a fourth step of detecting defects on said photomask by comparing said reference data with said sensor data; characterized in that said photomask design data includes non-testing region data indicating non-testing regions including pattern portions having a predetermined width or less and pattern spaces having a predetermined value or less; and

at said fourth step, said non-testing regions on said photomask, indicated by said non-testing region data, are excluded and said reference data is compared with said sensor data.